

## Series: TCF (Epoxy resin molded chip with built-in fuse)

Series TCF is a built-in fuse chip tantalum capacitor based on standard type TC. Fully-molded construction provides excellent mechanical protection, superior moisture resistance and high soldering heat resistance.

### FEATURES

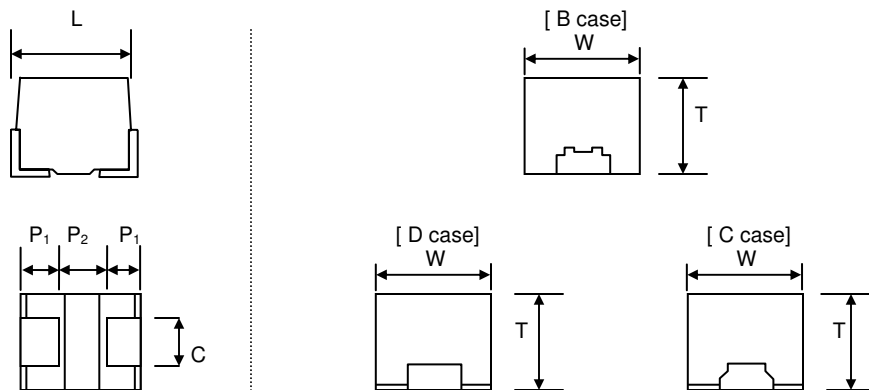
- Built-in fuse functions to melt under a large current and inhibit burning and smoking from capacitor.
- Suitable for filtering of supply with low impedance circuit and bypassing of random noise of source line in ultra high speed logical circuit
- Suitable for surface mounting
- Precise dimensions allow high density mounting. Symmetrical construction of positive and negative terminals provides "Self Alignment".
- Soldering: 260°C for 10 seconds by re-flow or flow soldering



### SPECIFICATIONS

|                             |  |
|-----------------------------|--|
| Failure rate level          | 1%/1000h                                   |
| Operating temperature range | -55 ~ +85°C to 125°C with voltage derating |
| Rated voltage               | 6.3 – 10 – 16 – 20 – 25 – 35 – 50 VDC      |
| Capacitance Range           | 0.15 ~ 150μF                               |
| Capacitance Tolerance       | ± 10%, ± 20%                               |

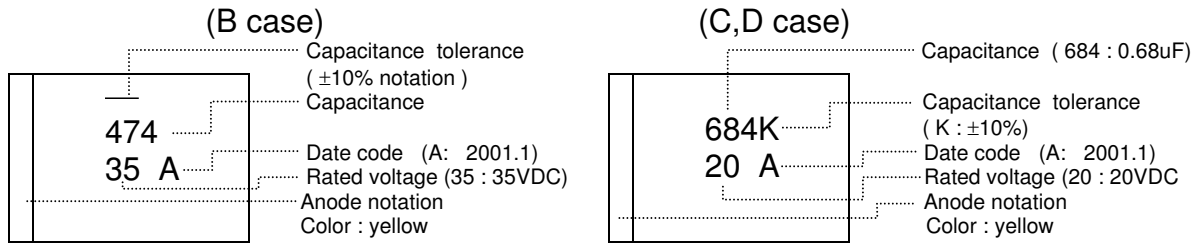
### DIMENSIONS (mm)



| Case Code | EIA Code | L ± 0.2 | W ± 0.2 | T ± 0.2 | P <sub>1</sub> ± 0.2 | P <sub>2</sub> ± 0.2 | C ± 0.1 |
|-----------|----------|---------|---------|---------|----------------------|----------------------|---------|
| B         | 3528     | 3.5     | 2.8     | 1.9     | 0.8                  | 1.5                  | 2.2     |
| C         | 6032     | 6.0     | 3.2     | 2.5     | 1.3                  | 3.0                  | 2.2     |
| D         | 7343     | 7.3     | 4.4     | 2.8     | 1.3                  | 4.0                  | 2.4     |

B, C, D case conform to EIA-535BAAC

## MARKING



## HOW TO ORDER TANTALUM CHIPS

| TCF Series  | 476 Capacitance  | K Tolerance        | 16 Voltage   | D Case Size | T Packaging                    | -P Lead Free |
|---|--|--------------------|--|-------------|--------------------------------|--------------|
| TC=Standard<br>TCL = Low Profile<br>TCF = with Fuse<br>TCLE = Low ESR | Rated capacitance in pF is represented by a three digit number. The first two digits are significant figures of the nominal capacitance. The third digit indicated the number of zeros | M = 20%<br>K = 10% | 6.3=06<br>10=10<br>16=16<br>20=20<br>25=25<br>35=35<br>50=50 | B<br>C<br>D | T= Tape & Reel<br>Blank = Bulk | -P = Pb free |

## STANDARD RATINGS

| R.V. (VDC)<br>Cap. (µF) | 6.3 | 10    | 16    | 20    | 25 | 35   | 50    |
|-------------------------|-----|-------|-------|-------|----|------|-------|
| 0.15                    |     |       |       |       |    |      | B     |
| 0.22                    |     |       |       |       |    |      | B     |
| 0.33                    |     |       |       |       |    |      | B     |
| 0.47                    |     |       |       |       |    |      | *B, C |
| 0.68                    |     |       |       |       |    |      | C     |
| 1.0                     |     |       |       |       | B  | B, C | C     |
| 1.5                     |     |       |       | B     | B  | C    | *C, D |
| 2.2                     |     |       | B     | B     |    | C    | D     |
| 3.3                     |     |       | B     | *B    | C  | C, D | D     |
| 4.7                     |     | B     | *B    | C     | C  | D    |       |
| 6.8                     |     | *B    | C     | C     | D  | D    |       |
| 10                      | *B  | *B, C | *B, C | D     | D  |      |       |
| 15                      |     | C     | D     | *C, D |    |      |       |
| 22                      |     |       | *C, D | *D    |    |      |       |
| 33                      |     | *C, D | D     |       |    |      |       |
| 47                      | C   | D     | *D    |       |    |      |       |
| 68                      | *D  | *D    |       |       |    |      |       |
| 100                     | *D  | *D    |       |       |    |      |       |
| 150                     | *D  |       |       |       |    |      |       |

\* available upon request

## RATINGS AND CATALOG NUMBERS

| Rated voltage / Surge Voltage | Catalog number | cap. (μF) | Case code | Max DC LC (μA) |      |       | Max Dissipation factor |      |      |       | Max ESR (Ω)<br>10KHz |
|-------------------------------|----------------|-----------|-----------|----------------|------|-------|------------------------|------|------|-------|----------------------|
|                               |                |           |           | 25°C           | 85°C | 125°C | -55°C                  | 20°C | 85°C | 125°C |                      |
| 6.3VDC / 8VDC                 | TCF106-06BT    | 10        | B         | 0.6            | 6    | 7.9   | 0.08                   | 0.06 | 0.06 | 0.08  | 3.0                  |
|                               | TCF476-06CT    | 47        | C         | 3.0            | 30   | 37    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.2                  |
|                               | TCF686-06DT    | 68        | D         | 4.3            | 43   | 54    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.0                  |
|                               | TCF107-06DT    | 100       | D         | 6.3            | 63   | 79    | 0.15                   | 0.08 | 0.08 | 0.10  | 1.0                  |
| 10VDC / 13VDC                 | TCF157-06DT    | 150       | D         | 9.5            | 95   | 118   | 0.15                   | 0.08 | 0.08 | 0.10  | 1.0                  |
|                               | TCF475-10BT    | 4.7       | B         | 0.5            | 5    | 6.3   | 0.08                   | 0.06 | 0.06 | 0.06  | 3.0                  |
|                               | TCF685-10BT    | 6.8       | B         | 0.7            | 7    | 8.5   | 0.08                   | 0.06 | 0.06 | 0.08  | 3.0                  |
|                               | TCF106-10BT    | 10        | B         | 1.0            | 10   | 13    | 0.08                   | 0.06 | 0.06 | 0.08  | 3.0                  |
|                               | TCF106-10CT    | 10        | C         | 1.0            | 10   | 13    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF156-10CT    | 15        | C         | 1.5            | 15   | 19    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF336-10CT    | 33        | C         | 3.3            | 33   | 41    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.2                  |
|                               | TCF336-10DT    | 33        | D         | 3.3            | 33   | 41    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.0                  |
| 16VDC / 20VDC                 | TCF476-10DT    | 47        | D         | 4.7            | 47   | 59    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.0                  |
|                               | TCF686-10DT    | 68        | D         | 6.8            | 68   | 85    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.0                  |
|                               | TCF107-10DT    | 100       | D         | 10             | 100  | 130   | 0.15                   | 0.08 | 0.08 | 0.10  | 1.0                  |
|                               | TCF225-16BT    | 2.2       | B         | 0.5            | 5    | 6.3   | 0.08                   | 0.06 | 0.06 | 0.06  | 3.0                  |
|                               | TCF335-16BT    | 3.3       | B         | 0.5            | 5    | 6.3   | 0.08                   | 0.06 | 0.06 | 0.06  | 3.0                  |
|                               | TCF475-16BT    | 4.7       | B         | 0.8            | 8    | 9.4   | 0.08                   | 0.06 | 0.06 | 0.08  | 3.0                  |
|                               | TCF685-16CT    | 6.8       | C         | 1.1            | 11   | 14    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF106-16BT    | 10        | B         | 1.6            | 16   | 20    | 0.08                   | 0.06 | 0.06 | 0.08  | 3.0                  |
|                               | TCF106-16CT    | 10        | C         | 1.6            | 16   | 20    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF156-16DT    | 15        | D         | 2.4            | 24   | 30    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.0                  |
|                               | TCF226-16CT    | 22        | C         | 3.5            | 35   | 44    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.2                  |
|                               | TCF226-16DT    | 22        | D         | 3.5            | 35   | 44    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.0                  |
| 20VDC / 26VDC                 | TCF336-16DT    | 33        | D         | 5.3            | 53   | 66    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.0                  |
|                               | TCF476-16DT    | 47        | D         | 7.5            | 75   | 94    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.0                  |
|                               | TCF155-20BT    | 1.5       | B         | 0.5            | 5    | 6.3   | 0.08                   | 0.06 | 0.06 | 0.06  | 3.0                  |
|                               | TCF225-20BT    | 2.2       | B         | 0.5            | 5    | 6.3   | 0.08                   | 0.06 | 0.06 | 0.06  | 3.0                  |
|                               | TCF335-20BT    | 3.3       | B         | 0.7            | 7    | 8.3   | 0.08                   | 0.06 | 0.06 | 0.08  | 3.0                  |
|                               | TCF475-20CT    | 4.7       | C         | 0.9            | 9    | 12    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF685-20CT    | 6.8       | C         | 1.4            | 14   | 17    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF106-20DT    | 10        | C         | 2.0            | 20   | 25    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF106-20DT    | 10        | D         | 2.0            | 20   | 25    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.0                  |
|                               | TCF156-20CT    | 15        | C         | 3.0            | 30   | 38    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.2                  |
|                               | TCF156-20DT    | 15        | D         | 3.0            | 30   | 38    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.5                  |
|                               | TCF226-20DT    | 22        | D         | 4.4            | 44   | 55    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.0                  |
| 25VDC / 32VDC                 | TCF105-25BT    | 1.0       | B         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 3.0                  |
|                               | TCF155-25BT    | 1.5       | B         | 0.5            | 5    | 6.3   | 0.08                   | 0.06 | 0.06 | 0.06  | 3.0                  |
|                               | TCF335-25CT    | 3.3       | C         | 0.8            | 8    | 9.6   | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF475-25CT    | 4.7       | C         | 1.2            | 12   | 15    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF685-25DT    | 6.8       | D         | 1.7            | 17   | 21    | 0.08                   | 0.06 | 0.06 | 0.05  | 1.0                  |
|                               | TCF106-25DT    | 10        | D         | 2.5            | 25   | 31    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.5                  |
| 35VDC / 44VDC                 | TCF105-35BT    | 1.0       | B         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 3.0                  |
|                               | TCF105-35CT    | 1.0       | C         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 3.0                  |
|                               | TCF155-35CT    | 1.5       | C         | 0.5            | 5    | 6.6   | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF225-35CT    | 2.2       | C         | 0.8            | 8    | 9.6   | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF335-35CT    | 3.3       | C         | 1.2            | 12   | 14    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.2                  |
|                               | TCF335-35DT    | 3.3       | D         | 1.2            | 12   | 14    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.0                  |
|                               | TCF475-35DT    | 4.7       | D         | 1.6            | 16   | 21    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.0                  |
|                               | TCF685-35DT    | 6.8       | D         | 2.4            | 24   | 30    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.5                  |
| 50VDC / 63VDC                 | TCF154-50BT    | 0.15      | B         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 5.0                  |
|                               | TCF224-50BT    | 0.22      | B         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 5.0                  |
|                               | TCF334-50BT    | 0.33      | B         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 3.0                  |
|                               | TCF474-50BT    | 0.47      | B         | 0.5            | 5    | 6.3   | 0.06                   | 0.04 | 0.04 | 0.06  | 3.0                  |
|                               | TCF474-50CT    | 0.47      | C         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 3.0                  |
|                               | TCF684-50CT    | 0.68      | C         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 3.0                  |
|                               | TCF105-50CT    | 1.0       | C         | 0.5            | 5    | 6.3   | 0.05                   | 0.04 | 0.04 | 0.05  | 3.0                  |
|                               | TCF155-50CT    | 1.5       | C         | 0.8            | 8    | 9.4   | 0.08                   | 0.06 | 0.06 | 0.08  | 1.2                  |
|                               | TCF155-50DT    | 1.5       | D         | 0.8            | 8    | 9.4   | 0.08                   | 0.06 | 0.06 | 0.06  | 1.5                  |
|                               | TCF225-50DT    | 2.2       | D         | 1.1            | 11   | 14    | 0.08                   | 0.06 | 0.06 | 0.06  | 1.5                  |
|                               | TCF335-50DT    | 3.3       | D         | 1.7            | 17   | 21    | 0.08                   | 0.06 | 0.06 | 0.08  | 1.0                  |

□ capacitance tolerance code "K" (±10%) or M (±20%)